Environmental Assessment for Geothermal Test Well Installation

Department of Veterans Affairs Medical Center, San Francisco, CA

4150 Clement Street,
San Francisco, CA 94121

Contract Number: VA776-RA-0037

Prepared for:
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MAY 2010

ENVIRONMENTAL ASSESSMENT
GEOTHERMAL TEST WELL INSTALLATION

SAN FRANCISCO VA MEDICAL CENTER

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Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
APE	Area of Potential Effects
ARB	Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BSL 2	Laboratory Biosafety Level 2
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAP	Bay Area 2000 Clean Air Plan
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CZMA	Federal Coastal Zone Management Act of 1972
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FONSI	Finding of No Significant Impact
FS	Feasibility Study
GSHE	Ground-Source Heat Exchange
HVAC	Heating, Ventilation and Air Conditioning
MTC	Metropolitan Transportation Commission
Muni	San Francisco Municipal Railway's
NAAQS	National Ambient Air Quality Standard
NCIRE	Northern California Institute of Research and Education
NEBC	National Energy Business Center, VA
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NREL	National Renewal Energy Laboratory
OSP	Oceanside Water Pollution Control Plant
%	percent

PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
QAP	Bay Area 2001 Ozone Attainment Plan
SFPUC	San Francisco Public Utilities Commission
SFVAMC	San Francisco VA Medical Center
TAC	Toxic Air Contaminants
USEPA	United States Environmental Protection Agency
UCSF	University of California San Francisco
USFWS	United States Fish and Wildlife Service
VA	Department of Veterans Affairs
VAMC	Veterans (Health) Administration Medical Center
VISN	Veterans Integrated Service Network
VISN 21	VA Sierra Pacific Network

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1.0 Purpose and Need for Proposed Action

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) and the Department of Veteran Affairs Environmental (VA) Compliance Manual. This EA provides the necessary information for VA to make an informed decision regarding the proposed installation of a geothermal test well at the San Francisco VA Medical Center (SFVAMC).

This EA identifies, documents, and evaluates the effects of the proposed action on existing resources at and around SFVAMC. An interdisciplinary team of engineers, planners and environmental experts were used and/or consulted in the preparation of this EA. This document presents a project-level overview of the current environmental and socioeconomic conditions at SFVAMC and potential impacts to these resources from each alternative.

1.1 INTRODUCTION

Alares, LLC (Alares) conducted an energy feasibility study (FS) for the Department of Veterans Affairs (VA) at the VA Medical Center (VAMC) located in San Francisco. California. The study included the assessment of 31 buildings at the SFVAMC campus. The purpose of this study was to assess the technical and economical feasibility for the potential retrofit of the aged heating, ventilating, and air-conditioning (HVAC) systems on campus, with a state-of-the-art geothermal systems. The two potential geothermal systems evaluated include: a) Direct-Use, and b) Ground-Source Heat Exchange (GSHE).

Alares completed the energy feasibility study in February 2010. Although the study indicated that direct use geothermal resources are not readily available at the SFVAMC location, this initial evaluation concluded that the local geology is suitable for ground source heat exchangers. Furthermore, the Alares energy study concluded that several of the SFVAMC buildings were good candidates for geothermal ground source heat exchanger applications. These candidate buildings included Buildings 8, 9, 10, 16, 22, 203, 208 and 210. Based on the initial evaluation, applicable heat exchanger designs included geothermal systems comprised of closed loop, open loop or standing column wells.

Based on the Alares findings, the VA is proposing to install a closed loop geothermal test well to collected additional geothermal field data for further assessment of a potential geothermal HVAC design to be implemented at SFVAMC. A drill rig will be used to install the test well. The test well is approximately four to six inches in diameter drilled to a depth of 200 feet below grade. 1” polyethylene tubing pipe with a U-turn is lowered to the bottom of the bore. The remaining space is filled with an environmentally-safe grout to seal the hole from potential ground water penetration. Grout also provides the means for thermal contact between the pipe and the surrounding earth. The test well can be drilled in two days.

Following the test well installation, a thermal conductivity test will be conducted to determine the thermal conductivity properties of the ground. Hot water, approximately 85°F, is circulated through the polyethylene tubing for 40 to 48 hours. Inlet and outlet water temperature readings are recorded over the two days. A small generator is used to power the circulator pump for the test.

This EA was prepared to analyze potential direct, indirect, and cumulative environmental impacts associated with the installation of a geothermal closed loop test well at the SFVAMC Campus (proposed ac-

tion). For purposes of comparison, this EA also evaluates the impacts of not installing the geothermal test well (e.g., No Action Alternative).

1.2 ENVIRONMENTAL ASSESSMENT PROCESS

The proposal to drill and construct a geothermal test well at the San Francisco VAMC is a federal action subject to the procedural requirements of the *National Environmental Policy Act of 1969* (NEPA) (42 U.S. Code 4321 et seq.). NEPA requires federal agencies consider environmental consequences in their decision-making process. The Council on Environmental Quality (CEQ) issued regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) to implement NEPA that include provisions for both the content and procedural aspects of the required environmental analysis. The VA complies with NEPA and CEQ implementing regulations in accordance with 38 CFR Part 26 (*Environmental Effects of the Department of Veterans Affairs Actions*).

This EA has been prepared to determine whether the proposed project would significantly affect the quality of the human environment. If the analysis finds that the project would not significantly impact the human environment, a Finding of No Significant Impact (FONSI) will be prepared, and the VA will proceed with the project. The CEQ regulations consider the human environment to include the natural and physical environment and the relationship of people with that environment. If the evaluation contained within this EA finds that the proposed action would significantly affect the human environment, NEPA requires the preparation of an Environmental Impact Statement (EIS). Economic or social effects, however, are not intended by themselves to require preparation of an EIS (40 CFR 1508.14).

1.3 PURPOSE AND NEED FOR PROPOSED ACTION

Specific laws and executive orders require federal agencies to reduce energy consumption and improve energy efficiency through the use of alternative fuels and renewable sources. The *National Energy Conservation Policy Act* serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it is regularly updated and amended by subsequent laws, most recently being the *Energy Independence and Security Act of 2007*. Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, updates prior energy management practices and goals, such as reducing energy intensity by three percent (%) annually through 2015 or by 30% by 2015, and requiring that half of renewable energy consumed annually is from new renewable sources. The EO directs federal agencies to implement renewable energy generation projects on agency property for agency use.

The VA has a need for reliable energy at its health care facilities while pursuing options for reducing energy demand and cost. The VA must also meet the renewable energy goals established by laws and executive orders. The purpose and need for installing and operating geothermal systems (proposed action) would be to meet EO 13423 goals through on-site installation of a renewable energy generation system, and to reduce the amount of electrical energy needed from commercial sources.

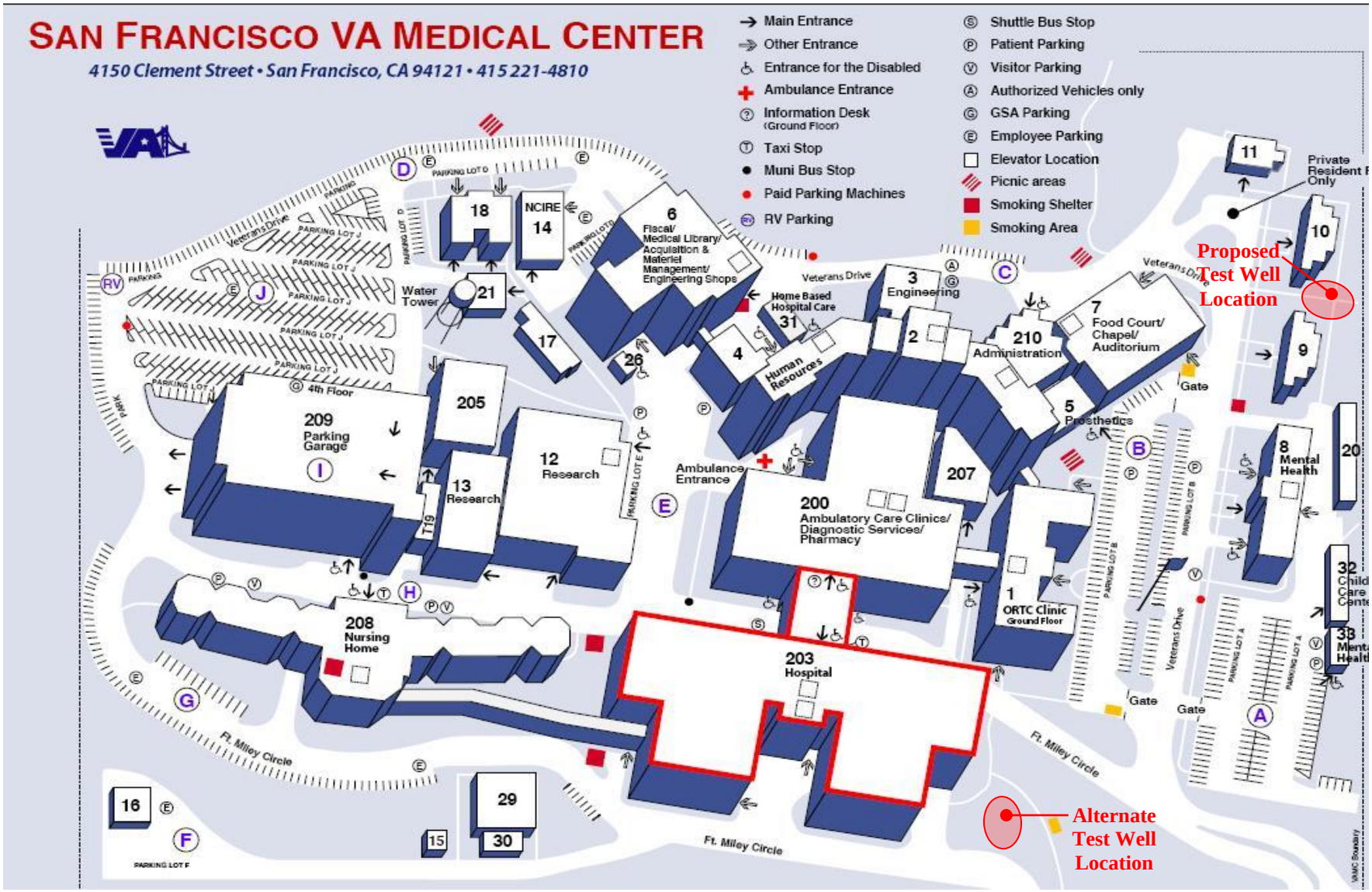
1.4 LOCATION OF PROPOSED ACTION

The San Francisco VAMC is part of the VA Sierra Pacific Network, Veterans Integrated Service Network 21 (VISN 21) (VA, 2010). The SFVAMC is a major tertiary care facility that serves as a VA regional referral center for specialized medical and surgical programs. In addition, the SFVAMC is part of the National Disaster Medical System (NDMS), a federally coordinated initiative that augments the nation's emergency medical response capability. The SFVAMC serves as the Federal Coordinating Center (FCC) for the Northern California area (VA, 2010).

The San Francisco VAMC is located at 4150 Clement Street, San Francisco, CA (Figure 1). The VAMC occupies approximately 29-acres in northwest San Francisco, and is generally bound by Clement Street / Seal Rock Drive and the Outer Richmond neighborhood to the south, El Camino Del Mar to the north, Lincoln Park to the east; and West Fort Miley to the west (Figure 1).

Figure 1 - Location of SFVAMC

Figure 2 – Location of Test Wells



The SFVAMC campus is located along a bluff overlooking the northwestern edge of San Francisco and the Pacific Ocean. The land to the north and west of the site drops sharply downward towards the ocean, while the terrain to the east and south slopes gradually through the Lincoln Park Golf Course (and Seacliff neighborhood), and the upper Richmond neighborhood (Figure 1).

The proposed geothermal test well will be installed in the northeast quadrant of the SFVAMC, between Buildings 9 and 10 within existing open space (Figure 2). An alternate location is proposed in the south-east quadrant of campus, just east of Building 203. Both locations are within existing open spaces.

1.5 DESIGN CONCEPT FOR PROPOSED ACTION

The two basic geoexchange technologies have been proposed for use at the SFVAMC include Closed-Loop and Standing Column Well System. Both of these technologies are forms of Ground Source Heat Exchange (GSHE) which uses wells to transfer heat between the steady temperature of the earth and a building to maintain the building space conditions. Below the surface of the earth the temperature remains in the 57°F range throughout the year. This stable temperature provides a source for heat in the winter and a means to reject excess heat in the summer. In a GSHE system, a fluid is circulated between the building and a well (or well field). In the summer the fluid picks up heat from the building and moves it to the ground. In the winter the fluid picks up heat from the ground and moves it to the building. Heat pumps in the building make this transfer of heat possible. This exchange of thermal energy makes the system efficient. Rather than creating heat by burning a fuel on site, the geoexchange system moves thermal energy between the ground and the building, using heat pump technology.

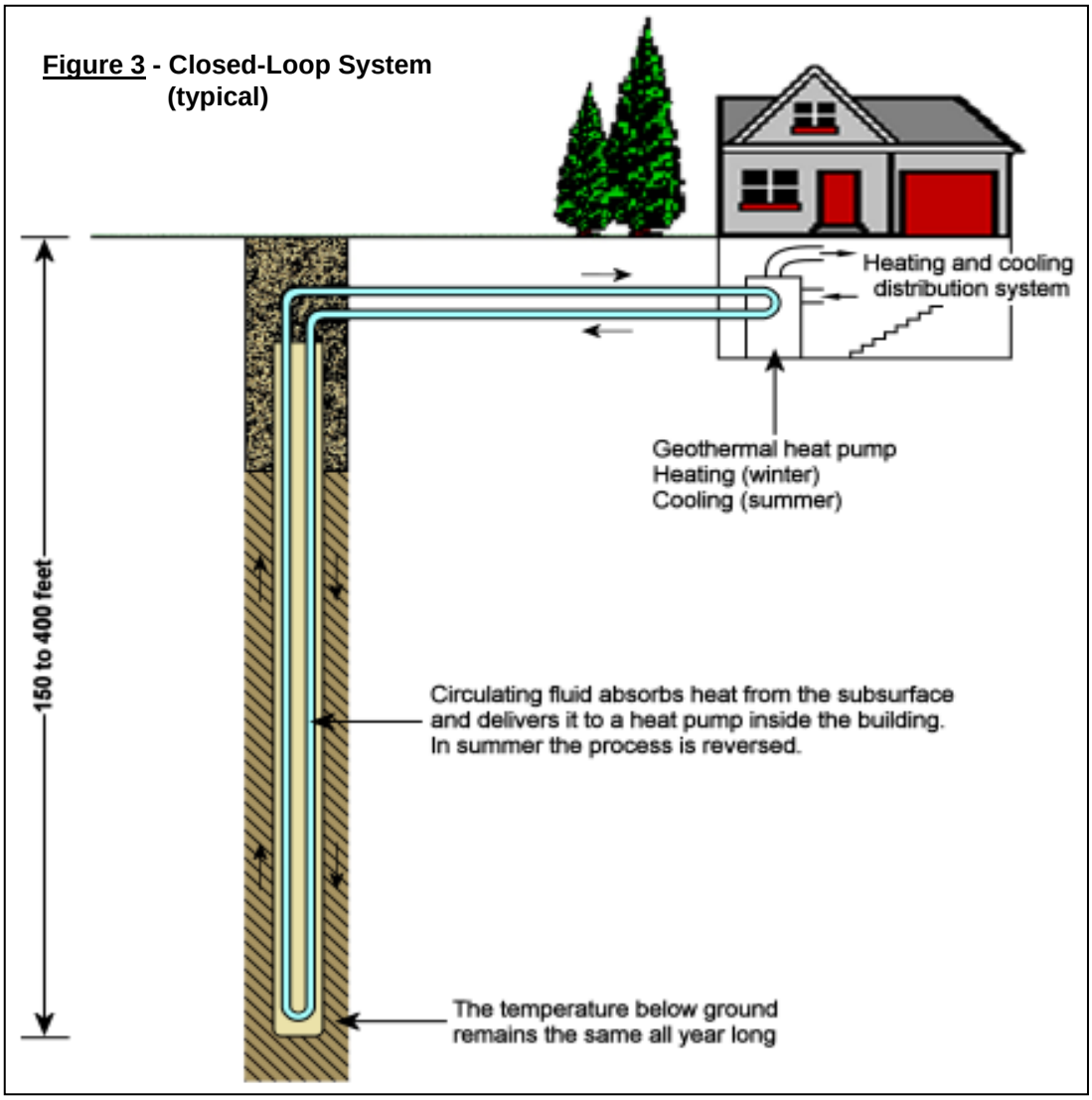
1.5.1 Closed-Loop Systems

In a closed loop system, a series of buried pipes circulates a heat transfer fluid in a **closed loop**: the fluid never leaves the system, but rather travels back and forth in a loop between the earth connection and the heat pump (Figure 3). The length of the ground loop is determined by the size of the heating and cooling loads and the ground thermal properties. The loads are defined by the size of the building, type of construction, use of the building, duration of the heating and cooling seasons, and climate.

Closed-loop systems are environmentally benign. They are sealed so that no fluid is exchanged with the environment. The fluid often includes an antifreeze solution to protect the heat pump equipment. The high density polyethylene piping used in geoexchange systems is the same or higher grade of pipe used in cross country natural gas piping and often comes with a fifty year warranty.

The vertical bore configuration is a popular choice for systems of all sizes because of its efficient use of space. Each bore hole is four to six inches in diameter. A pipe is lowered to the bottom of the bore, makes a U-turn and returns to the top of the bore. The remaining space is filled with a grout to seal the hole from potential ground water penetration. Grout provides the means for thermal contact between the pipe and the surrounding earth. The header combines the flow through all the circuits before going to the building portion of the loop. The header can be installed outdoors in a valve pit or all of the circuits can be brought into the building before being combined. Six to twelve individual bores are typically connected to form a circuit, and each circuit connects to a header through a shut-off valve for circuit isolation.

Figure 3 - Closed-Loop System (typical)



1.6 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

A Notice of Availability (NOA) for the EA will be published in the San Francisco Chronicle. In addition, the NOA will be mailed to interested individuals, organizations, and government agencies and copies will be posted at the SFVAMC. Copies of the EA will be made available for review at the SFVAMC and at local libraries (San Francisco Main Library and the Anza Branch). The VA will consider public comments submitted within the 30-day public review period. If analysis finds that the proposed action would not significantly impact the human environment, a Finding of No Significant Impact (FONSI) will be prepared and approved.

If it is determined that significant impacts to the environment cannot be avoided or if there is no feasible way in which significant impacts can be mitigated, an EIS will be prepared to further details these potential impacts.

1.7 STATUTES AND REGULATIONS

Typical statutes, regulations, and Presidential Executive Orders guiding VA project planning, development, and operation are listed below. These policies and guidelines are applicable to a variety of projects at all VA facilities and some may not apply to the proposed action. Where relevant, Section 3 discusses specific laws, regulations, and permits that may affect the proposed action:

- National Environmental Policy Act of 1969, as amended
- Executive Order 12088, Federal Compliance as amended
- Clean Water Act of 1977, as amended
- Federal Water Pollution Control Act, Sec. 313, As Amended by Clean Water Act of 1977 (33
- U.S.C. 1323)
- EPA Regulations on the National Pollutant Discharge Elimination System (40 CFR 122)
- National Earthquake Hazards Reduction Act of 1977, as amended
- Executive Orders 12699 and 12941
- Noise Control Act of 1972
- Coastal Zone Management Act (16 U.S.C. 1451 et seq, Amended By PL 101-508)
- EPA Regulations on Polychlorinated Biphenyls Manufacturing, Processing Distribution in Commerce and Use Prohibitions (40 CFR 761)
- Uniform Federal Accessibility Standards (42 U.S.C. 4151-4157, Amended By PL 90-480)

2.0 Alternatives

2.1 PROPOSED ACTION OVERVIEW

The proposed action at the San Francisco VAMC is the installation of a geothermal test well. The purpose of this test well is to collect geological and geothermal test data for use in the design of the proposed, full-scale geothermal HVAC systems at selected building locations. Based on the FS completed by Alares, the two basic geoexchange technologies were proposed for use at the SFVAMC are as follows:

- Closed-Loop System (Figure 3): Buildings 8, 9, 10, 16 and 22
- Standing Column Well System (Figure 4): Buildings 203, 208 and 210

Both of these technologies are forms of Ground Source Heat Exchange (GSHE) which uses wells to transfer heat between the steady temperature of the earth and a building to maintain the building space conditions. A fluid is circulated between the building and a well (or well field). Heat pumps in the building make this transfer of heat possible. This exchange of thermal energy makes the system efficient. Rather than creating heat by burning a fuel on site, the geoexchange system moves thermal energy between the ground and the building, using heat pump technology.

The first step in the proposed action would be drilling a test boring at the SFVAMC to evaluate geological and geothermal parameters for the system design. As with all geothermal designs, test borings and thermal conductivity testing are required to determine the thermal characteristics of the ground, the expected capacity of the well, number and depth of wells that will be required to meet the buildings heating and cooling needs, and field evaluation of the local geological features that may influence the installation of geoexchange systems.

2.2 ALTERNATIVES

Alternatives were developed following review of information about existing facilities and space requirements at the SFVAMC campus, projected facilities needs, input from SFVAMC officials and the VA National Energy Business Center (NEBC), and the core mission of the SFVAMC.

2.2.1 Alternative No. 1 – Proposed Action

Under this alternative, a 200-foot closed-loop geothermal test well will be installed between Buildings 9 and 10 as described in the Proposed Action (Figure 2). The test borings and well construction will be completed to perform the required evaluation of geothermal parameters for the system design and full-scale installation will be implemented as follows:

2.2.2 Alternative No. 2 – Relocation of the Closed-Loop Test Well Southeast of Building 203

Under this alternative, the geothermal test well will be relocated to the existing open space located near the southeast corner of Building 203 (Figure 2). As with Alternate No. 1, the test well under this alternate will be a 200-foot closed-loop design.

2.2.3 Alternative No. 3 – No Action

Under this alternative, a geothermal test well will not be installed at the SFVAMC.

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED

2.3.1 Direct-Use Geothermal

The energy feasibility study (FS) performed for geothermal systems at the San Francisco VAMC initially included direct-use geothermal as a potential option (Alares, 2010). Yet, based on the geological findings of the Alares FS, direct-use geothermal is not considered a viable technology at this site, and was eliminated as an alternative design.

2.3.2 Geothermal HVAC System Based on a Standing Column Well Design

The energy feasibility study (FS) performed for geothermal systems at the San Francisco VAMC included a standing column well design as a feasible option to support the proposed geothermal HVAC system retrofit. Following the review of the Alares geothermal FS report, the VA elected to exclude an open-loop geothermal well design, and concluded that a closed-loop system is preferable. As such, the standing column well design was eliminated as an alternative design.

3.0 Affected Environment

3.1 INTRODUCTION

This section presents the baseline environmental and socioeconomic conditions at the SFVAMC. The existing environmental conditions serve as a baseline from which to identify and evaluate potential changes or impacts attributable to the proposed action and alternatives (i.e., affected environment). Baseline environmental conditions were identified during a site visit to the San Francisco VAMC in January 2010 and from aerial photos, topographical maps, existing documents, data from planning and resources agencies' websites, and communications with VA personnel.

The intent of NEPA is to focus the analysis on the human (i.e., physical, biological, and social) environment potentially affected by the federal action. Resources and attributes of the human environment that are not present on or in the vicinity of SFVAMC, or that would not be affected by the proposed action or alternatives are not discussed. Table 3-1 lists these resources and provides the rationale for excluding these resources from further description and from impact analysis. Measures that will be incorporated into the proposed action to avoid or minimize adverse impacts are described in the specific resources sections in this chapter.

TABLE 3-1 - RESOURCES OR ATTRIBUTES NOT DESCRIBED OR EVALUATED

Resource/Attribute	Rationale for Excluding from Evaluation
Agricultural resources	The proposed action would not result in development on any areas containing agricultural resources of statewide importance.
Mineral Resources	There are no known mineral resources located on the site.
Aviation/Radar	The proposed action will not affect flight patterns or radar communication used by aircraft.
Community Service	No public services, facilities, or utilities would be altered that could affect the community as existing utilities will be avoided.
Economic Activity	The overall estimated construction costs and short time for construction would not affect the local economy. Although construction workers may patronize nearby businesses, any short-term beneficial affect to the economy would be negligible. Because the installation of geothermal systems is not unique to the area, an adequate construction workforce is available.
Environmental Justice	The proposed action would not have significant adverse impacts, and therefore, any low income or minority populations that may be in the vicinity of SFVAMC will not be disproportionately affected.
Potential for Creating Substantial Controversy	Use of renewable energy sources is generally viewed by the public as favorable. The installation of a geothermal system would not likely create any negative controversy for the VA.
Real Property	The proposed action will be within the boundaries of San Francisco VAMC. No change in land ownership, boundaries or encroachments on critical areas, changes of easements, or tax values would occur. Therefore real property is not addressed in this EA.
Resident Population	The operation and maintenance of a geothermal system will not increase or affect the workforce at SFVAMC. There are no residential neighborhoods adjacent to or in close proximity to the proposed site that could be affected.
Environmental Regulations	The installation and operation of the direct use geothermal system will comply with applicable regulations.

3.2 AESTHETICS/VISUAL RESOURCES

The SFVAMC is located along a bluff overlooking the northwestern edge of San Francisco and the Pacific Ocean, between Point Lobos and the Golden Gate. The campus is bounded by Clement Street and the Outer Richmond District neighborhood to the south, and property owned by other federal agencies to the north, east and west.

SFVAMC sits at an elevation of 300 to 350 feet relative to mean sea level (msl), and is higher than the areas in its immediate vicinity. The area to the north and west of the SFVAMC drops sharply downward towards the ocean, while the land to the east and south slopes gradually through the Lincoln Park Golf Course and Seacliff neighborhood, and the Richmond District neighborhoods, respectively. The SFVAMC is not located adjacent to any designated state scenic highways nor is it near any roads that are part of the San Francisco 49-Mile Scenic Drive.

The SFVAMC is characterized by the facility's visually prominent buildings and the natural features that surround them – mainly mature, native trees – located both within and adjacent to the developed area. Monterey pine and Monterey cypress are the most visible vegetation in the area, and are found in landscaped areas within the SFVAMC site as well as in the adjacent, natural areas. These trees and other vegetation partially screen views to and from areas within the southern and southwestern portions of the SFVAMC. However, in views from points outside of the SFVAMC, the trees and vegetation do not completely obscure the site's mostly developed and disturbed nature, as evidenced by the buildings, paved roadways, gravel lots and outdoor storage areas.

3.3 LAND USE

The SFVAMC is a 29-acre site in the northwestern corner of the City and County of San Francisco. The site is bounded by Clement Street /Seal Rock Drive and the Outer Richmond District neighborhood to the south, and property owned by other federal agencies to the north, east and west (Figure 5). The SFVAMC site is zoned "Public Use" in the City and County of San Francisco's Zoning Map. The Outer Richmond District is a residential neighborhood comprised of moderate density development, with a mix of single family homes and apartment buildings. The residential area immediately south of the SFVAMC is zoned RH-1 (Residential, House Districts, Single-Family) and RH-2 (Residential, House Districts, Two-Family).

Existing land uses on the SFVAMC campus vary. The two largest and main buildings at SFVAMC are Buildings 200 and 203, which focus on outpatient and inpatient care, and are located in the center and south end of the site. The original cluster of residential buildings (e.g., Buildings 9, 10 and 11) is located in the northeast corner of the site. The remaining buildings generally have multiple functions for administrative, support and research services.

3.4 TRANSPORTATION AND PARKING

The SFVAMC campus is located off of Clement Street (which turns into Seal Rock Dr.), and has entrances at 42nd and 43rd Avenues (Figure 4). 42nd Avenue is the main entrance for patients, visitors, and staff. Veterans Drive (which turns into Fort Miley Circle) is the road that loops around the campus property San Francisco Municipal Railway's ("Muni") Route 38 bus has one stop within the SFVAMC campus along Miley Circle between the front entrances to Buildings 203 & 200.

Figure 4 – SFVAMC Land Use Map

There are approximately 1,214 total parking spaces at the SFVAMC (Figure 2). The largest parking area at the SFVAMC is the 422-space parking garage located near Building 209. Patient and visitor traffic is reportedly concentrated in Parking Lots A, B, E, and H. Patient and visitor parking are situated so that they are located in close proximity to the main hospital buildings. SFVAMC employees park in Lots D, E, G, and J. Aside from the Building 209 parking garage, all other parking at SFVAMC is located on surface lots.

Note: There is a reported parking shortage at the SFVAMC, which has resulted in parking overflows in to the adjacent Outer Richmond District neighborhood. Parking studies performed through the VA have projected total excess parking demands for the SFVAMC of over 600 spaces.

3.5 AIR QUALITY

Air quality in San Francisco County is regulated by the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), and Bay Area Air Quality Management District (BAAQMD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation.

Air quality regulations in the San Francisco Bay Area focus on the following air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), lead, and respirable and fine particulate matter (PM10 and PM2.5). Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as “criteria air pollutants.” The federal Clean Air Act (CAA) required the EPA to establish national ambient air quality standards (NAAQS) for these criteria air pollutants. The California Clean Air Act (CCAA), which was adopted in 1988, required the ARB to establish California ambient air quality standards (CAAQS). The ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS.

BAAQMD attains and maintains air quality conditions in the County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of BAAQMD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. BAAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, federal Clean Air Act Amendments of 1990 (CAAA), and the CCAA.

In an effort to reach attainment of the state and national ozone standards, the BAAQMD prepared the Bay Area 2000 Clean Air Plan (CAP) and the 2001 Ozone Attainment Plan (OAP). More recently, the BAAQMD, in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), has prepared the Bay Area 2005 Ozone Strategy. The Ozone Strategy is a plan showing how the air basin will achieve compliance with the state 1-hour ambient air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins (BAAQMD 2008).

With respect to ozone, the County is currently designated as a nonattainment area for the state 1-hour (serious) and national 8-hour (marginal) ambient air quality standards, respectively (CARB 2006). The County is also designated as a nonattainment area with respect to the state PM10 and PM2.5 standards (CARB 2006). For all other state and national ambient air quality standards, the City and County is designated as an attainment and/or unclassified area.

Toxic Air Contaminants (TACs) refer to a category of air pollutants that poses a present or potential hazard to human health, but which tend to have more localized impacts than criteria pollutants. There are no ambient standards for TACs, instead stationary sources are regulated directly through emission standards and risk reduction strategies implemented at the sources of the emissions. When a new source of TACs is proposed, a health risk assessment may be needed to estimate the project's potential health risks.

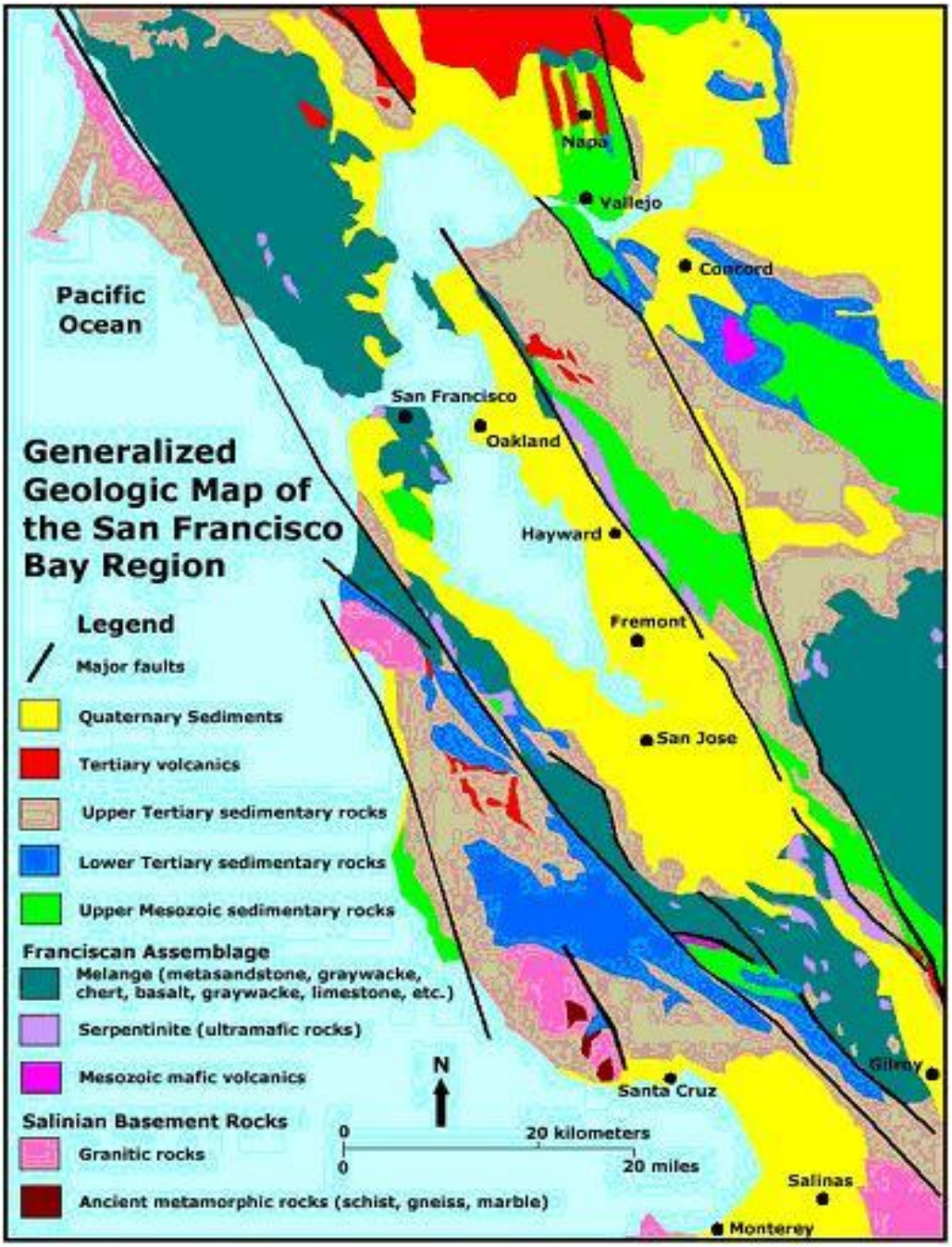
Asbestos is the name given to a number of naturally occurring fibrous materials that have been used in a variety of building materials including walls, ceilings, floors, fire proofing, and pipe insulation. Asbestos is made up of microscopic bundles of fibers that may become airborne when distributed. These fibers get into the air and may become inhaled into the lungs, where they may cause severe health problems. Sensitive receptors are identified areas that would be used by persons most sensitive to the effects of air pollution, such as the very young, the elderly, or people weak from illness or disease. These receptors are generally residences, schools, hospitals, and retirement homes. The project site itself is a medical center/hospital location, including a child care center for employees; both would be considered a sensitive receptor. Beyond the SFVAMC campus, the nearest sensitive receptors are residential homes on the south side of Clement Street/Seal Rock. Located near the western edge of San Francisco overlooking the Pacific Ocean, the site has relatively good air quality because of windy conditions and a location generally upwind of source emissions.

3.6 GEOLOGY AND SOILS

The SFVAMC is situated on the northwestern corner of the San Francisco Peninsula in the San Francisco North Quadrangle. The local area of the SFVAMC is underlain by multiple rock types emplaced when the Pacific crustal plate subducted (slid beneath) the North American crustal plate and which are known as the Franciscan Assemblage (Figure 5). As the subduction transpired, materials on the North American plate were scraped off and intimately mixed with materials generated in the Pacific Ocean depths. The resulting formations are called a "mélange" (a French word meaning "a mixture") and they include, but are not limited to, metamorphosed sandstones, greywackes (dirty sandstones derived primarily by erosion of volcanic formations), argillites, ribbon cherts (siliceous rocks created from the exoskeletons of plankton), serpentinites (metamorphosed basic subsea volcanic rocks), greenstones altered submarine basic lavas), and limestones.

Within the area of the SFVAMC campus these mélange formations are overlain by a veneer of highly permeable Quaternary-age sandstones, dune sand and weathered Franciscan bedrock. This formation generally consists of clean, well-sorted, fine- to medium-grained sand, underlain by weathered Franciscan bedrock. The Franciscan Assemblage has been compressionally folded and both thrust and shear (strike-slip) faulted as the California coastline has evolved. The result is that permeability has been locally enhanced in the vicinity of faults transecting competent rock units but has been locally decreased in places where juxtaposed rock units have been ground into mylonite and clay by tectonic forces.

Figure 5 – Geological Map of San Francisco Bay Area



Source: Stopher, 2002

There are three visible faults in the vicinity of the SFVAMC and two mal outside the site and do not pose a risk to the proposed alternatives. Two of the three visible faults run on either side of the site; however, the site is not in a mapped Alquist-Priolo Fault Zone (Note: The **Alquist-Priolo Earthquake Fault Zoning Act** was signed into California law on December 22, 1972 to mitigate the hazard of surface faulting to structures for human occupancy).

3.7 FLOODPLAINS, WETLANDS, WATERSHEDS, RIVERS, LAKES, COASTAL ZONE, ETC.

Based on the *City and County of San Francisco Community Safety Element,* San Francisco is not subject to flooding of natural waterways (CCSF 1996). The National Flood Insurance Program, which designates flood-prone areas, does not provide floodplain mapping for urban areas. Therefore no floodplain designation is available for this site. The SFVAMC is located on the high point of a bluff at approximately 300 to 350 feet relative to mean sea level (msl). Since the project is located at a higher elevation than the surrounding landscape, flooding hazard is not present. Also, due to the site's elevation of 300 to 350 ft relative to msl, it is well above any tsunami run up inundation zone. Neither wetland areas nor any water courses are located within the project site.

3.8 HYDROLOGY AND WATER QUALITY

REGIONAL SETTING

The proposed project area is characterized by the sloping hillside bluffs of Point Lobos and Lands End. The terrain surrounding the SFVAMC campus has a sharp downward drop toward the Pacific Ocean on the north and west, a gentle slope to the east toward the Seacliff neighborhood, and a moderate slope toward the lower-lying Richmond district neighborhood. The average annual rainfall in the site area is 19.89 inches. Most of the area precipitation falls as rain during the months from October through April.

The project site is within the San Francisco Public Utilities Commission (SFPUC) combined storm system area of service. In San Francisco, the combined sewer system (which collects both sewer and storm water) is comprised of a distribution system (including approximately 1,000 miles of underground pipes and 23,000 street drains), water pollution control plants, an underground system of storage/transport tanks, and effluent outfalls to the San Francisco Bay and Pacific Ocean (SFPUC 2010a). Storm water generated at the SFVAMC would likely go to the 60 mgd Oceanside Water Pollution Control Plant (OSP) prior to discharge through the 4.5 mile Southwest Ocean Outfall in the Pacific Ocean (SFPUC 2010b)

SITE SPECIFIC SETTING

The project site is located within a completely improved medical center campus, with features including paved streets with curbs, gutters, and storm drain inlets. Runoff on the SFVAMC site is currently handled by surface water collection via an existing drainage system consisting of collection inlets and drainage pipes along roads on the campus.

3.9 NOISE

The noise environment at the SFVAMC is influenced by roadway traffic on Clement Street/Seal Rock Dr., 42nd and 43rd avenues, and the perimeter road within the SFVAMC. In addition, parking lot noise (e.g., car doors slamming, car alarms, engines starting, voices, etc.), building mechanical and ventilation equipment, and loading docks also contribute, to a lesser extent, to the existing noise environment. Sensitive noise receptors (e.g., residences) in the project vicinity include patients on site, a childcare center

located about 200 feet south of Building 9, existing residences located to the south along Clement Street/Seal Rock Dr., and users of open space areas to the east, north, and west.

The VA requires project contractors to implement noise control measures in its Environmental Protection Specification, Section 01568. The measures require that noise be minimized using every action possible, including performing noise producing work during less sensitive hours of the day or week.

According to the Environmental Protection Specification, the construction activities are to be performed only during the hours of 8:00 am and 5:00 pm, unless otherwise permitted by local ordinance. San Francisco's noise ordinance (Article 29 of City Police Code) prohibits construction work between the hours of 8:00 pm and 7:00 am, if noise would exceed the ambient noise level by five dBA at the property line, unless a special permit is authorized by the Director of Public Works. Repetitive impact noise on the property should not exceed the following decibel (dB) limitations as shown in Table 3-2

Table 3-2 – Noise (Decibel, dB) Limitations

TIME DURATION OF IMPACT	NOISE SOUND LEVEL (dB)
More than 12 Minutes	**70**
Less than 30 seconds in any hour	**85**
Less than three minutes of any hour	**80**
Less than 12 minutes of any hour	**75**

At 50 feet from the source, the VA requires that equipment sound muffling devices must meet maximum permissible construction equipment noise levels established in the Environmental Protection Specification. The maximum sound level for most equipment ranges from 75 to 80 dBA. Physical barriers should be used to restrict noise transmission. The use of silencers on equipment intakes and mufflers on the intake and exhaust of combustion engines would also reduce noise levels. Truck loading, unloading, and hauling operations should be conducted to keep noise levels at a minimum.

The City of San Francisco Municipal Code, defines noise levels for commercial and industrial property noise limits and construction related noise. Under the City's noise ordinance, no person shall produce, suffer or allow to be produced by any machine or device, or any combination of same, on commercial or industrial property, a noise level more than eight dB above the local ambient at any point outside of the property line.

3.10 UTILITIES

The SFVAMC is already served by services and utilities, which include water, storm drainage, sanitary sewer, electric, and gas service lines. Operational demands of water, sewer, gas, and electricity are currently being met.

The SFVAMC is located within a combined sewer and drainage system area of service. The site is fully developed and storm drainage and capacity for storm runoff is in place. Please refer to Section 3.8, Hydrology, Water Quality for additional discussion on drainage.

3.11 VEGETATION AND WILDLIFE

The SFVAMC sits on 29-acres of the former Fort Miley Military Reservation (the historical ruins of a fully recessed military armament). Natural areas within this location are limited to the few undeveloped spaces outside the SFVAMC campus (e.g., beyond the VAMC property line). In general, the extended areas appear weed choked when compared with the cliff areas. This is partly because the area has been so disturbed with so many projects over the years that weeds thriving on disturbed soils currently dominate.

The boundary between SFVAMC and Fort Miley is delineated with a chain link fence and dense vegetation that has overgrown since Fort Miley was decommissioned after World War II. As a result, the boundaries of the historic district have some areas of thick Monterey Cypress, willows and cottonwoods forming a green buffer between the SFVAMC, and the surrounding properties (VerPlanck, 2002).

Vegetation and wildlife at the SFVAMC is typical for a costal urban setting. Observed vegetation assemblages located on the SFVAMC campus have included primarily non-native plant species, including Monterey pine (Pinus radiata) and Monterey cypress (Cupressus macrocarpa), and understory assemblages dominated by English Ivy (Hedera Helix), German ivy (Senecio mikanioides), Himalayan blackberry (Rubus discolor), passion flower (Passiflora sp.) and common weeds. While both Monterey pine and Monterey cypress are species native to California, they are commonly planted as a landscape species. Open areas are dominated by nonnative annual grasses and weedy species, but may include native California blackberry (Rubus ursinus) growing within the larger and more dominant thickets of Himalayan blackberry.

The wildlife expected at the site would be acclimated to human disturbance. The proposed locations for the installation of geoexchange system are existing open areas and paved parking lots that will be restored to their original condition following the installation process. Potential staging areas are primarily located on areas of paved or bare ground covered by duff or annual grass and ruderal (weedy) species. Although groundcover will be disturbed, it is not anticipated that any trees will require removal or relocation. While these trees are not protected, the Monterey pine trees may provide potential nesting habitat for migratory birds, which are protected under the Migratory Bird Treaty Act. It is also likely that a variety of other avian species and small mammals utilize the site, and all migratory nesting birds could be affected by the removal of trees and groundcover during the nesting season.

No special-status plant or wildlife species are expected to be encountered at the site locations.

Note: Today, the northeastern quadrant of the SFVAMC is the last remaining area of the campus that retains a landscape aesthetic similar to that which was established in 1934 via the original campus design. The wooded area behind Building 9 and 10, as well as the landscaped area in front of these buildings retain the character of the campus's early years (VerPlanck, 2002).

3.12 SOLID WASTE

The SFVAMC serves as a major tertiary care referral center for military veterans throughout Northern California. The facility has 124 acute care hospital beds and is renowned for its state-of-the-art acute medical, neurological, surgical and psychiatric care. In addition to the medical care, the SFVAMC is equipped with a variety of laboratories that support operational and research procedures. Laboratories at the SFVAMC are required to adhere to practices associated with Laboratory Biosafety Level 2 (BSL 2). Work at BSL 2 laboratories can involve agents of moderate potential hazard to personnel and the environment. These hazards are not relevant to the proposed action, given that no BSL laboratories are located within the project site.

3.13 CULTURAL RESOURCES

The SFVAMC site is bounded by Clement Street / Seal Rock Drive and the Outer Richmond neighborhood to the south, and property owned by other federal agencies to the north, east and west. The 29-acre campus is located within the former Fort Miley Military Reservation at Point Lobos. The historical setting for this site includes information regarding the historic conditions associated with the proposed project area and the Area of Potential Effects (APE). The APE encompasses the construction footprints, all construction areas and any buildings, structures or other cultural resources adjacent to those areas where potential project-related effects may occur. Part of the proposed project is located within the proposed SFVAMC historic district, and is adjacent to Fort Miley Military Reservation, a listed NRHP district that is administered by another federal agency. Because the proposed project involves the contributing elements of a historic property that have previously been determined eligible for the NRHP, the entire proposed SFVAMC historic district is included in the APE.

The following historical context is taken from the San Francisco VA Medical Center at Fort Miley Historical and Architectural Assessment (VerPlanck, 2002).

3.13.1 Historical Setting

Prehistoric Period

The Point Lobos/Lands End district of San Francisco was an area of considerable activity in both prehistoric and historic periods. Archaeological sites have been discovered to the west of the campus, near the Sutro Bath ruins, providing evidence for the existence of seasonal Native American settlements within a mile of the SFVAMC campus. The area now comprising Point Lobos was located within the boundaries of the lands controlled by the Ramaytush tribelet, a subgroup of the Ohlone tribe. Although they did not have any permanent villages in the area, they used the coastal area around Point Lobos for seasonal camps inhabited during shellfish gathering expeditions. These remains, located within the Point Lobos Archeological Sites National Register district, consist primarily of shell middens. No cultural resources associated with the Native American period have been discovered on the SFVAMC campus.

Mexican and Early American Periods

The site's recorded history began in 1774, when Spanish explorers first glimpsed the Golden Gate from its heights. During the late Mexican and early American periods, Point Lobos was part of a land grant

owned by Francisco Guerrero. The vast rancho had been granted by the last Mexican governor of California, Pio Pico. In 1850, shortly after California achieved statehood, President Millard Fillmore set Point Lobos aside for military use due to its strategic location on the western approach to the Golden Gate. Within a year, Fillmore rescinded this appropriation and the land reverted to the ownership of Guerrero. For almost two decades, the land remained unoccupied with the exception of a semaphore signaling station, dated as early as 1853. After spotting a ship, the staff of the signaling station at Point Lobos would telegraph an advance warning to their counterparts at the semaphore station on top of Telegraph Hill. The staff of the latter facility would then sound the horn to give San Franciscans advance warning of the impending arrival of a ship through the Golden Gate.

Golden Gate Cemetery

Believing that the close proximity of cemeteries to residential districts was unhealthful, San Francisco authorities began searching for remote tracts of land in which to bury the City's dead in the 1860s. In 1868 the City purchased 200 acres of land at Point Lobos, including the site of the future SFVAMC, for $127,465. This tract was designated a municipal cemetery. For the next quarter century, Golden Gate Cemetery provided a place for poor and working class San Franciscans to bury their dead. Many of the City's ethnic groups laid claim to various sections of the cemetery. Golden Gate Cemetery also had a "potters field" where the City would bury its indigent citizens. It is unknown whether any remains survive beneath the present-day SFVAMC. According to contemporary sources, when the cemetery was converted into a military installation the remains were all carefully exhumed and reinterred in Colma.

Fort Miley Military Reservation at Point Lobos

In 1890, the U.S. Army began to systematically modernize and reconstruct its outdated coastal defenses. Known as the Endicott Period this system entailed the construction of networks of coastal batteries at the approaches to important harbors and coastal cities. These networks of coastal defense facilities were designed to thwart potential seaborne invasions by ensuring that the field of fire would saturate every square foot of sea approaching a critical seaport or harbor. For San Francisco Bay, the Army Corps of Engineers planned coastal batteries for Point Lobos the Marin Headlands, Alcatraz, Fort Mason and other strategic points around the Golden Gate.

In January 1893, the U.S. Army paid the City and County of San Francisco $75,000 for 54 acres of strategically situated Golden Gate Cemetery land overlooking the approaches to the Golden Gate. Construction did not begin right away, however. According to contemporary newspaper articles all of the graves first had to be exhumed and reinterred elsewhere. Construction of the Reservation at Point Lobos, as it was originally called, did not begin until 1897. The first buildings constructed included a half-dozen wood-frame barracks, storage buildings, an officers' club and administrative buildings. Fort Miley would eventually include several distinct clusters of fortifications, including Batteries James Chester, LaRhett Livingston and Anton Springer, built between 1899 and 1901. In 1900, the post was renamed Fort Miley after Lieutenant Colonel John D. Miley. Killed in the Philippines in 1899, Miley had been largely responsible for the actual planning of San Francisco's network of coastal batteries.

Fort Miley was divided into three parts, with a battery complex on the east, a battery complex on the west, and the garrison quarters, offices and storage in the center. The western portion contained four rifled battery structures, a searchlight power plant, fire control stations, and earthworks completed in 1941. Con-

struction of Battery Chester began in 1899 and completed in 1901. It had three main 12-inch rifles mounted on carriages and an additional battery of 16 12-inch mortars. The eastern portion consisted of a four-pit mortar battery. Constructed in concrete and earth and completed in 1901, Battery LaRhett Livingston consisted of four large pits, each with four 12-inch mortars. An administrative decision to divide the four pits into two operations renamed the southern two pits as Battery Anton Springer in 1906. The Fort Miley post, officially garrisoned in 1902, was developed with a horseshoe-shaped Parade Ground and several frame barracks and quarters in the center of the reservation between the east and west batteries (the current site of the SFVAMC campus). Built between 1902 and 1906, the post included an ordnance storehouse, barracks, quartermaster storehouse, a hospital, a guardhouse, engineers' shop, a headquarters, and officers' quarters. During World War I, more buildings were constructed, as well as Battery Loren D. Call and another small anti-aircraft battery. Constructed towards the end of the Endicott system battery network era, the Fort Miley batteries were quickly outdated with the advent of aerial bombardment. The Fort Miley garrison was decommissioned in 1922.

In 1930, the City of San Francisco competed with other California cities to influence the Federal Board of Hospitalization to designate the city as a favorable site in which to erect a new veterans' hospital and diagnostic center. Actively campaigning in this direction, the city managed to attract the Board's favor by urging it to consider two locations with the city limits; Pine Lake Park, located adjacent to Sigmund Stern Recreation Grove; and Fort Miley. The VA had originally favored the construction of a hospital on the main Presidio grounds, but this was turned down by the War Department, which in turn offered the 54 acres of Fort Miley at no cost to the city. In August, 1930, the Federal Board of Hospitalization chose the Fort Miley site. Money had already been appropriated for construction and all that remained was Congressional approval of the location. On April 8, 1931 the site selection committee announced that work was underway and that they would have a site within the next two weeks. A bill, sanctioning transfer of 25 acres of land at Fort Miley from the Army to the Veterans Administration, passed the House of Representatives and the Senate in 1932.

The batteries at Fort Miley continued to operate until 1937, when the coastal batteries were deemed obsolete. The Japanese attack on Pearl Harbor on December 7, 1941 led to the reactivation of Fort Miley batteries. New anti-aircraft guns were added and the post was garrisoned until permanently decommissioned in 1943. The remaining acreage of Fort Miley, east and west of the hospital site, containing buildings and artillery bunkers, was not included in the transfer from the Army to the VA. The Fort Miley Military Reservation, divided into East Fort Miley and West Fort Miley and not including the SFVAMC campus in the center, was listed in the National Register of Historic Places (National Register, NRHP) in 1980.

SFVAMC

By November 1932, the VA Department of Construction Services drew up plans for the new SFVAMC. An article in the November 6, 1932 edition of the San Francisco Chronicle announced that construction of the facility would begin in January 1933. The new $1.5 million public works project was to be paid in part by President Hoover's Finance Corporation. The new SFVAMC would accommodate 404 men and employ 200 administrative staff. The SFVAMC would collaborate with the nearby University of California Medical School and accommodate veteran patients from the western region.

The construction of the SFVAMC took almost two years to complete. In February 1933, the U.S. Army began demolishing the barracks and related buildings at the old post of Fort Miley. Excavation and foundation work began in March 1933. The construction bid went to the Los Angeles-based Herbert M. Baruch Corporation. Construction alone was to cost $898,000 in addition to $235,000 for plumbing, $30,000 for elevators and $19,000 for electrical work. By the autumn of 1934, the SFVAMC was largely completed and began accepting patients.

World War II

The official dedication of the SFVAMC took place in early 1935, and for six years the history of the institution was relatively uneventful. Due to the activity of the Fort Miley batteries during World War II, the SFVAMC patients were evacuated for the duration of the War. In 1943, Fort Miley was permanently deactivated and in 1946 the patients were returned to the SFVAMC.

Post-World War II Period

Despite the dramatic increase of veterans following the World War II, the SFVAMC underwent comparatively few physical changes for almost two decades. In 1963, the SFVAMC was awarded a large grant in order to pay for a three-phase modernization program. The first phase consisted of the construction of Building 200, a new clinic and administration building, and the new home for clinical and anatomical laboratories and the radiology department. In 1967, Building 12 was substantially enlarged and converted into a research center. The second phase did not begin until 1973 when a new power plant (Building 205), reservoir and pumping station (Buildings 29 and 30) and a new 440-bed hospital building, designed by William Pereira, (Building 203) were constructed. The third phase began in 1989 with the construction of a four-level parking structure (Building 209), seismic upgrades, a nursing home, and completed in 1993, with a multi-story office building addition (Building 210).

Northern California Institute Research Education

In 1988, the Northern California Institute of Research and Education (NCIRE) a private, non-profit, research corporation, was founded on the SFVAMC grounds to administer VA-approved research and related education funding. NCIRE has been expanding rapidly and currently administers over $25 million in research funds. Since 1988 NCIRE has been housed in a series of temporary buildings and portables erected on various unoccupied sections of the grounds. In 2000, NCIRE moved into Building 14, a new structure placed on Veterans Drive between Buildings 6 and 18.

3.13.2 Affected Resources

The proposed work at the SFVMC would affect a National Register-eligible historic district, including two of its contributing resources, and a National Register-listed historic district. Also located within the APE is B/13, which was constructed in 1934 but is not within the boundaries of the proposed SFVAMC Historic District.

Proposed SFVAMC Historic District

The SFVAMC campus was originally determined to be eligible for National Register listing in 1981 under Criteria A and C. A Determination of Eligibility was made by Gjore J. Mollenhof, VA Federal Preservation Officer, and was signed by the Keeper of the National Register on May 11, 1987. The 2005 National Register nomination proposed a historic district eligible under Criteria A and C that contained 14 contributing buildings and 18 non-contributing buildings. Karen R. Tupek, VA Federal Preservation Officer, and Milford W. Donaldson, State Historic Preservation Officer, certified the nomination, but the nomination was later withdrawn. The VA resubmitted the nomination for listing of a historic district on the NRHP to SHPO on October 30, 2008, and officially accepted to the Historic Register on April 20, 2009. The accepted nomination proposed a historic district that contains 13 contributing buildings, six non-contributing buildings, and one non-contributing structure set on 12 acres of the overall 29-acre campus. The district's boundaries are located in the eastern and northern edge of the campus. The district includes buildings on either side of Veterans Drive, from the intersection with Clement Street on the southeast corner of the campus, running north to the northeast corner, then commencing west, terminating at Building 18.

Designed by VA architects, the contributing structures were built by the Herbert M. Baruch Corporation. The buildings in the district were mainly constructed in 1933-1934 in Art Deco style elaborated with Mayan-inspired ornate polychrome terra cotta moldings, termed "Mayan Deco" to describe a West Coast interpretation of the style that was particularly popular in southern California. The completion of the original SFVAMC campus in 1934 consisted of 21 buildings designed in the Mayan Deco style set in a sprawling semiformal landscape of lawns and undulating paths to lessen the impact of large concrete buildings on the adjacent neighborhood, and to provide ample space for patient convalescence and recreation. Two areas within the SFVAMC Historic District retain a high degree of integrity: the eastern portion of the campus including Buildings 1, 8, 9, 10 and 11, and the northwestern portion of the campus including Buildings 4, 6 and 18. To date, these two areas have undergone the fewest number of permanent alterations.

The boundary between SFVAMC and Fort Miley is delineated with a chain link fence and dense vegetation that has overgrown since Fort Miley was decommissioned after World War II. As a result, the boundaries of the historic district have some areas of thick Monterey Cypress, willows and cottonwoods forming a green buffer between the SFVAMC, and the surrounding properties. Today, the northeastern quadrant of the SFVAMC is the last remaining area of the campus that retains a landscape aesthetic similar to that which was established in 1934 via the original campus design. The wooded area behind Building 9 and 10, as well as the landscaped area in front of these buildings retain the character of the campus's early years.

The SFVAMC Historic District includes 13 contributing buildings (Buildings 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 18, 20); six non-contributing buildings (Buildings 14, 25, 26, 31, 32, 210); and one non-contributing structure (Structure 202). Of the 13 contributing buildings, Buildings 1, 6, 8, 9, 10 and 11 are intact to a high degree, while many of the other original 1934 buildings have been unsympathetically altered, particularly those with large additions. The boundaries of the historic district do not include most of the later infill buildings on the original SFVAMC campus.

The original SFVAMC campus was very consistent in terms of the building materials and design. Despite substantial alterations, many of the buildings retain enough historic fabric that they continue to be visually

identified as historic structures, giving the historic sections of the campus a unified aesthetic that survives today. The massing and proportions of the historic buildings are generally very dramatic with bold, horizontal podiums and thick concrete walls playing off delicate terra cotta ornament and strong vertical lines. The entrances are usually located in the center of each façade. On the larger and more prominent buildings, stepped parapets often project above the rooflines. The towers add substantial visual interest to the campus and help to give it a dramatic appearance. The Mayan Deco ornamentation appears on several of the contributing buildings in various forms of molded and inscribed terra cotta door surrounds, friezes, belt courses and spandrel panels.

Building 9, an affected historic resource as part of the proposed action, is part of a cluster of buildings that were originally built to house SFVAMC staff. Identical to Building 10 to the north, both were constructed in 1934 as a pair of matching duplexes for the medical officers, primarily doctors, pharmacists, etc. The buildings now contain hoptel services. Building 9 is a two-story-over-basement, 7,312-square-foot, reinforced concrete building, with an irregularly shaped plan with side facades that step back to a smaller rear facade, and a stepped parapet roof. The façade is eight bays wide, with the second floor stepped back to six bays. There are two entrances, one in the third bay in from each corner. Although not as heavily detailed as others within the district, its façade is elaborated to a relatively high degree with a sculpted terra cotta frieze, pylon-shaped door hoods and other Mayan-inspired ornament. The concrete exterior is finished in a thin layer of stucco. The exterior has undergone few changes aside from the replacement of the original casements with double-hung wood windows. Building 9 retains a high degree of integrity and is a significant contributor to the historic district.

Building 10, like Building 9, is part of a cluster of buildings that were originally built in 1934 to house SFVAMC staff. It was constructed as an officers' duplex, and is now used for hoptel services. It is a two-story-overbasement, 7,312-square-foot, reinforced-concrete building with an irregularly shaped plan and a stepped parapet roof. The façade is eight bays in width, with the second floor stepping back to six bays. There are two entrances, one located in the third bay in from each corner. The façade of Building 10 is architecturally significant with its sculpted terra cotta frieze, pylon-shaped door hoods and Mayan-inspired ornament. The concrete exterior is finished in a thin layer of stucco. The exterior has undergone few changes aside from the replacement of the original metal casements with double-hung wood windows and the addition of awnings at the entrances. Building 10 also retains a high degree of integrity and is a significant contributor to the historic district.

Building 13

Built in 1934, Building 13 is an original building on the SFVAMC campus. Although formerly considered contributing to a the SFVAMC Historic District, Building 13 is no longer included in the current nomination "due to its separation from the district by non-contributing buildings. Since it is not appropriate to use the discontiguous district format to include an isolated resource which was once connected to the district, but has since been separated through new construction, this building is not included in the district nomination" (Bright and Bamburg 2008).

Building 13 was originally constructed as the main boiler plan/laundry facility for the SFVAMC campus, and has since undergone significant interior alteration. The building now contains computer based research modules. Its location on the edge of the original campus denotes its original utilitarian function. It is a two-story, 10,000-square-foot, reinforced concrete building with a rectangular plan and a flat roof. Its

architectural design is relatively plain with concrete walls, steel industrial sash and minimal detailing. Building 13 appears to have undergone comparatively few exterior changes since 1934, retaining its Art Deco entrance elaboration. Nevertheless, Building 13 does not otherwise possess a high enough level of architectural significance for individual listing, and as it is separated from the other district buildings within the proposed historic district, it is not eligible for the NRHP.

Fort Miley Military Reservation

Fort Miley Military Reservation was listed in the NRHP on May 23, 1980. It is nationally significant as it pertains to the defense of the San Francisco harbor during the period from 1892 to 1950. The fortification of Point Lobos was part of the final phase of the Endicott system of coastal defense that focused on protecting the inner harbor. The defense engineering theory is represented in the Chester and Livingston concrete and earth batteries, and later installations demonstrate the evolution of defense strategies. From the turn of the 20th century through World War II, Fort Miley was part of the historically significant coastal defense system that also incorporated the Presidio of San Francisco, Fort Mason, Fort Winfield Scott, Fort Funston, Fort Baker, Fort Barry, Fort Cronkhite and Fort McDowell. Despite being divided by the site of the former Post of Fort Miley which has been occupied by the SFVAMC campus since 1934, the surviving batteries are in a historic district with two parts, East Fort Miley and West Fort Miley. The current growth of the thick vegetation obscures some views from both portions of the district. The Fort Miley Military Reservation retains a high level of integrity, particularly around its battery walls.

3.14 SOCIOECONOMICS

The SFVAMC is a major tertiary care referral center and provides outpatient, long term, and home based care for veterans throughout Northern California. In addition to patient care, the SFVAMC also has clinical programs in acute medical, neurological, surgical and psychiatric care. The SFVAMC is affiliated with the University of California San Francisco (UCSF) School of Medicine and provides approximately one third of all medical student training for the UCSF teaching hospital (SFVAMC 2005). Research programs also have a large role at the SFVAMC, which has one of the largest funded research programs in the Veterans Health Administration (SFVAMC 2005). The SFVAMC population, which includes VA and non-VA employees, volunteers, and short-term residents, is approximately 3,075.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

4.1.1 Impact Analysis

This chapter discusses the potential consequences of each alternative, including Alternative 3, the No Action Alternative, on environmental and socioeconomic resources at the SFVAMC. The impact discussion is organized by alternative and resource category, reflecting the order of those topics in Section 3.

Alternative 1 includes the installation of a Closed-Loop geothermal test well in the open space between Buildings 9 and 10 (Figure 2); while Alternate 2 proposes the installation of the same Closed-Loop geothermal test well in the existing open space located southeast of Building 203.

4.1.2 Significance Criteria

In accordance with regulations implementing NEPA, the term "significance" is used to describe the magnitude of potential impacts, considering both the context and intensity of the impact. Significance can vary in relation to the context of the action. For proposed actions, context may include consideration of effects on a national, regional, or local basis, and both short term and long term effects may be relevant. Impacts also are evaluated in terms of their intensity or severity. Factors contributing to the intensity of an impact include the following:

- The degree to which the action affects public health or safety;
- The proximity of the action to resources that are legally protected by various statutes, such as wetlands, regulatory floodplains, or resources listed in the National Register of Historic Places;
- The degree to which the action would adversely affect federally listed endangered or threatened species or their habitat;
- The degree to which the action is related to other actions with individually insignificant but cumulatively significant impacts; and
- Whether the action threatens to violate federal, state, or local laws imposed for protecting the environment (summarized from CEQ Regulations, Section 1508.27).

In addition, impacts were assessed to ensure compliance with Executive Order 12898, Environmental Justice. The guiding principle of the executive order is to avoid disproportionately high and adverse human health or environmental effects from federal policies and actions on minority and low-income populations. Effects on target populations of the Environmental Justice Executive Order are discussed in the section on socioeconomic effects.

The impact analysis assesses the potential change in environmental conditions that could result from implementing each of the three alternatives. If no adverse or beneficial effects would result, the action is considered to have no impact. If there is an effect, the impact is compared against significance criteria to determine if the impact is likely to be significant. Specific significance criteria used in this analysis for each resource area is presented in Table 4-1.

Table 4-1 - Significance Criteria for Impact Analysis

RESOURCE AREA	SIGNIFICANCE CRITERION
Aesthetics	• Adversely degrades the existing visual character or quality of the site and its surroundings • Substantially adversely affects a scenic vista • Results in substantial light or glare
Land Use	• Conflicts with established recreational, educational, or scientific uses • Conflicts with land use goals of the community • Results in substantial alteration of present or planned land use
Transportation and Parking	• Causes traffic volumes to exceed capacity of area roadways • Causes the operating conditions at one or more approaches at an un-signalized intersection to become impacted • Results in parking demand exceeding capacity
Air Quality	• Causes or contributes to a violation of state or federal ambient air quality standards • Results in emissions increases that have the potential to delay the projected date for attainment of state or federal air quality standards • Violates procedural, operational, monitoring, or reporting requirements of federal, state, or local air quality agencies
Geology and Soils	• Causes substantial soil erosion or loss of top soil • Exposes people to geologic hazards such as strong seismic ground shaking, seismic related ground failure, liquefaction, or landslides.
Floodplains, Wetlands, Watersheds, Rivers, Lakes, Coastal Zone, etc.	• Results in construction within 100- or 500-year floodplain • Results in loss of wetlands or adversely degrades critical environmental area of wetlands
Hydrology, Water Quality	• Causes substantial flooding, erosion, or siltation • Adversely affects any significant water body, including marine sanctuaries • Exposes people to reasonably foreseeable hydrologic hazards, such as flooding • Results in substantial alteration of surface water drainage and/or ground water regime
Noise	• Violates land use compatibility criteria and applicable noise guidelines • Generates new sources of substantial noise that violates applicable noise guidelines • Increases intensity of noise levels to sensitive receptors
Community Services and Utilities	• Results in an increase in wastewater generation requiring the expansion or construction of sewage treatment plants • Violates federal, state, or local treatment standards for wastewater quality • Results in an increase in demand on public utilities requiring the construction of new or expanded facilities • Results in an increase in demand for public utilities exceeding available supply • Results in an increase in demand for public services including fire protection, police protection, parks, or other community services.
Vegetation and Wildlife	• Causes disruption to or removal of an endangered or threatened species, its habitat, migration corridors, or breeding areas

	• Results in the loss of a substantial number of native plant or animal species that could affect abundance or diversity beyond normal variability
Solid/Hazardous Waste	• Results in substantial increase in solid waste • Results in emissions of hazardous emissions or transportation of hazardous
Cultural Resources	• Results in direct or indirect change to historical, archaeological, or paleontological resources.
Socioeconomics	• Substantially alters the location and distribution of the ROI population or causes the population to exceed existing growth rates • Adversely affects the local housing market and vacancy rates • Results in substantial increase in resident population or alteration of demographic characteristics • Adversely affects local economy

4.2 ALTERNATE NO. 1: PROPOSED ACTION – INSTALLATION OF A CLOSED-LOOP GEOTHERMAL TEST WELL BETWEEN BUILDINGS 9 AND 10

Under this alternative, a geothermal test well would be completed and tested as previously described. The location of the test well is the open space between Buildings 9 and 10 (Figure 2).

4.2.1 Aesthetics

The proposed project would result in alterations to only the open space between the buildings. There would be no change in the buildings' overall size, and the disturbance to the exterior spaces will be restored to their original condition. Because alterations to these buildings would not alter the visual character of the buildings or expand their footprints, there would be no aesthetic impact from these proposed actions.

4.2.2 Land Use

The installation of a geothermal test well would not create a new or significant impact to current land use. The proposed site is a current open space. The proposed action would not add to, or detract from the existing land use, but would provide the SFVAMC with a "Green" source of heating & cooling services. Because the disturbances to the land would be temporary, there would be no long-term impact to land from these proposed actions.

4.2.3 Transportation and Parking

Implementation of the proposed action would not use existing parking spaces or otherwise reduce the availability of parking spaces at the SFVAMC during the installation of the geothermal test well. Furthermore, it is not anticipated that this action will result in any transportation impacts. As such, no short- or long-term parking or transportation impacts would result.

4.2.4 Air Quality

Operational Emissions

As previously stated, this action will not result in an increase in the size or the use of the building, or associated land. The number of VA employees or patients would not increase as a result of this alternative. Therefore, this alternative will not result in an increase in operational emissions result from increased VA staff or patients.

Construction Emissions

Foreseeable construction activities would occur during site preparation, grading, drilling activities, trenching and earth moving operations. Construction activities would require the use of a drill rig, grout mixer, and a roll-off container. During construction, air quality could potentially be affected for a short time period. Heavy equipment could create fugitive dust and emit reactive organic gas (ROG), NOx, CO, SO2, and PM (10 and 2.5) emissions as a result of diesel fuel combustion. The primary pollutant of concern in fugitive dust would be PM10. PM10 is also released as a result of construction activities such as excavation or soil movement.

Construction emissions would be short term and temporary (2-3 days). Construction phase operations would take approximately one week for the test well installation.

MITIGATIVE ACTIONS- AIR QUALITY (CONSTRUCTION DUST)

Implementation of the following Mitigative Actions, in accordance with BAAQMD standard mitigation requirements for areas near sensitive receptors, would reduce construction related air quality impacts to a minimal level. No long term mitigation would be required.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Sweep daily all paved access roads, parking areas, and staging areas at the construction sites.
- Sweep public streets adjacent to construction sites daily if visible soil material is carried onto the streets.
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose or cover to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Suspend excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour.

4.2.5 Geology and Soils

Concerns for adverse impacts from site geology and soils during the proposed action are related to substantial soil erosion or loss of top soil, and off-site sediment releases. A secondary concern relates to the potential exposure of people to geologic hazards such as strong seismic ground shaking, seismic related ground failure, liquefaction, or landslides.

Ground disturbance generally results in increased erosion potential from exposure of bare soils to wind and storm water runoff; however, if standard construction practices are followed, and best management practices (BMP) for erosion and stormwater control are implemented and followed (see Section 4.2.4, Air Quality), potential impact from soil erosion would be negligible. Drilling activities will disturb approximately 10 square feet of top soil.

4.2.6 Floodplains, Wetlands, Watersheds, Rivers, Lakes, Coastal Zones, etc.

Floodplain impacts relating to the installation of geothermal systems at the SFVAMC would be considered minimal because these activities would not displace flood waters to nearby properties and would result in minimal alterations to runoff conditions around the site (see the Hydrology and Water Quality section of this document). Although the proposed action will result in short-term disturbances to site surface features, the installation of a geothermal test boring and well will not alter the long-term impervious site characteristics.

All site runoff will be collected and treated for sediment removal (as needed) to comply with federal, state and local regulations prior to the permitted release of site water to the storm drains, and San Francisco's integrated sewer/stormwater system.

The proposed location of the geothermal test well is not located within the CZMA, and therefore, does not require a consistency determination.

4.2.7 Hydrology and Water Quality

Storm water runoff can impact water quality, contributing sediment and other pollutants exposed at construction sites. Any potential impacts to water quality from the installation of a closed-loop geothermal test well would be short-term, localized, and negligible.

4.2.8 Noise

The proposed action would result in temporary increases in ambient noise levels intermittently for approximately three months. Construction equipment such as a drilling rig, trencher, cement truck, and equipment delivery trucks would generate noise intermittently during daylight hours. San Francisco VAMC occupants are currently exposed to noise from traffic and VAMC operations and thus construction occurring daylight hours would not be expected to have any further adverse effect.

Operational noise from geothermal system pumps would be negligible and inaudible against ambient levels. Maintenance of the geothermal system may generate noise but the expected decibel level and frequency of occurrence would not impact sensitive receptors. .

Construction activity would increase ambient noise levels in the project area; however, noise levels would not exceed the specified limitations established by the VA's Environmental Protection Specification, provided the contractors follow the limits established in the specification. As such, the overall impacts from construction, operation, and maintenance noise would be below any typical threshold of significance.

4.2.9 Community Services and Utilities

Because there would be no change in the type of operations undertaken at the SFVAMC, and no substantial expansion of the services provided, there would be no impact on police protection, fire protection, parks or other community services.

4.2.10 Vegetation and Wildlife

Evaluation of special-status plant and wildlife species with potential to occur within the region was performed through database searches of the California Department of Fish and Game's (CDFG) California Natural Diversity Database (CNDDB), the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants, and the United States Fish and Wildlife Service (USFWS) database of federally endangered and threatened species. Because the proposed action would be undertaken by a federal agency on federally-owned property, only federally protected species are subject to review. However, all special-status species, including those protected by the State of California, and plants listed by the CNPS, were reviewed and searched for during the field surveys.

Installation of the geothermal test well would have no significant impacts to vegetation because the existing environments are open spaces with simple groundcover, shrubs, ruderal (weedy) species, or are bare ground.

Construction activities would displace common wildlife species that inhabit or use the area for forage or cover and potentially cause direct mortality of less mobile species. Because the site is currently disturbed from frequent human activity, any impact to wildlife would be negligible.

There is no plant or wildlife species listed by the U.S. Fish and Wildlife Service as threatened or endangered known to occur at the SFVAMC. Overall, the sensitive plant species that occur within the region have little suitable habitat at the SFVAMC site. Most birds are protected by the Migratory Bird Treaty Act, which provides protection from harm by prohibiting the destruction of active nesting habitat. Should removal of any trees be required for construction, any active nests would be avoided to prevent impacting any migratory bird.

4.2.11 Solid/Hazardous Waste

The proposed geothermal test well would result in a short term increase in construction waste generation. An Environmental Protection Plan pursuant to the Department of Veterans Affairs Environmental Protection Specifications Section 01568 will be prepared for this proposed action. This plan will specify controls to be taken to manage environmental pollution, which includes the handling and disposal of solid waste. All solid waste will be transported and disposed of in compliance with Federal, State, and local regulations.

The installation of the geothermal test boring/well will not require disturbance to the existing buildings. As such, no potential asbestos material will likely be encountered during this proposed action.

No hazardous waste will be generated during the construction of the geothermal test boring/well.

4.2.12 Cultural Resources

The proposed work at the SFVMC would be performed within a National Register-listed historic district and in close proximity to contributing resources (e.g., Buildings 9 and 10), but the proposed action will not disturbed these resources. The proposed action will be performed in existing open spaces, and will have a low probability for impact to known cultural resources at the SFVAMC.

ARCHAEOLOGICAL RESOURCES

Due to the presence (or suspect presence) of prehistoric resources near the project area, as well as a high level of documented historic activity within the project area, there is a possibility of encountering subsurface cultural resources during project related ground disturbing activities. As such, the proposed action could pose a moderate adverse impact. The following Mitigative Action shall be implemented in the event that subsurface cultural resources are encountered during ground disturbance activities and construction.

MITIGATIVE ACTION - ARCHAEOLOGICAL RESOURCES

Implementation of the following Mitigative Action is required to avoid any potential adverse effect from the proposed project on the inadvertent discovery of archaeological resources. Archaeological resources may take the form of stone tools and tool fragments, unusual amounts of burned or unburned shell and bone, as well as glass, metal, and ceramic objects. If an archaeological resource is discovered, activities shall be halted, and a qualified professional archaeologist shall be consulted. The archaeologist, in consultation with the State Historic Preservation Office, shall determine whether the resource is potentially significant. It is not expected archaeological resources will be encountered since the drilling borehole is approximately six inches in diameter.

4.2.13 Socioeconomics

SFVAMC employment and patient activities would not be changed as a result of the proposed geothermal test well installation. The construction personnel onsite would result in a short term increase in the number of persons working at the SFVAMC. The number of personnel would vary from three to five, depending on the phase of work.

There would be no long term change to the SFVAMC employee population under this alternative and staffing levels would remain the same. The overall estimated construction costs and short time for construction would not affect the local economy. Although construction workers may patronize nearby businesses, any short-term beneficial affect to the economy would be negligible.

The proposed action would not have significant adverse impacts, and therefore, any low income or minority populations that may be in the vicinity of SFVAMC would not be disproportionately affected.

Overall, the proposed action will not: 1) Substantially alter the location or distribution the local population, 2) Adversely affects the local housing market and vacancy rates, or 3) Results in substantial increase in resident population or alteration of demographic characteristics.

4.3 ALTERNATE NO. 2: INSTALLATION OF A CLOSED-LOOP GEOTHERMAL TEST WELL NEAR THE SOUTHEAST CORNER OF BUILDING 203

Under this alternative, a closed-loop test well will be installed within the existing open space near the southeast corner of Building 203.

4.3.1 Aesthetics

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Because alterations to these buildings would not alter the visual character of the buildings or expand their footprints, there would be no aesthetic impact from the proposed action.

4.3.2 Land Use

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. The proposed action would not add to, or detract from the existing land use. Because the disturbances to the land would be temporary, there would be no long-term impact to land from these proposed actions.

4.3.3 Transportation and Parking

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. The proposed action would not add any additional burden to the existing parking condition at the SFVAMC.

4.3.4 Air Quality

Operational Emissions

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. As previously stated, the installation of a geothermal test boring/well will not result in an increase in the size or the use of the site, and the number of VA employees or patients would not increase as a result of this alternative. Therefore, this alternative will not result in an increase in operational emissions result from increased VA staff or patients.

Construction Emissions

Construction related air emissions for this alternate design will be similar to Alternate No. 1. Foreseeable construction/demolition activities would occur during site preparation, grading, drilling activities, trenching and earth moving operations. Construction activities would require the use of drill rigs, heavy trucks, excavating and grading equipment, grout mixers, cranes, and other mobile and stationary construction

equipment. During construction, air quality could potentially be affected for a short time period. Heavy equipment could create fugitive dust and emit reactive organic gas (ROG), NOx, CO, SO2, and PM (10 and 2.5) emissions as a result of diesel fuel combustion. The primary pollutant of concern in fugitive dust would be PM10. PM10 is also released as a result of construction activities such as excavation or soil movement.

Construction emissions would be short term and temporary. Construction phase operations would take approximately one week for the test well installation.

MITIGATIVE ACTIONS- AIR QUALITY (CONSTRUCTION DUST)

Implementation of the following Mitigative Actions, in accordance with BAAQMD standard mitigation requirements for areas near sensitive receptors, would reduce construction related air quality impacts to a minimal level. No long term mitigation would be required.

- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Sweep daily all paved access roads, parking areas, and staging areas at the construction sites.
- Sweep public streets adjacent to construction sites daily if visible soil material is carried onto the streets.
- Enclose or cover to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Replant vegetation in disturbed areas as quickly as possible..
- Suspend excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour.

4.3.5 Geology and Soils

Concerns for adverse impacts from site geology and soils during the proposed action operation are similar to Alternate No. 1, as such, potential impact from soil erosion would be negligible provided that adequate site controls are implemented and maintained.

4.3.6 Floodplains, Wetlands, Watersheds, Rivers, Lakes, Coastal Zones, etc.

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Floodplain impacts relating to the installation of geothermal systems at the SFVAMC would be considered minimal because these activities would not displace flood waters to nearby properties and would result in minimal alterations to runoff conditions around the site. Although the proposed action will result in short-term disturbances to site surface features, the installation of geothermal borings and well fields will not alter the long-term impervious site characteristics.

Although the project site does fall within the coastal zone boundary, the proposed action under this alternative, would not affect the coastal zone and therefore, does not require a consistency determination. Furthermore, as defined in Section 304 of the Federal Coastal Zone Management Act (CZMA) of 1972 as

amended, the term “coastal zone” does not include “lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal government.” The SFVAMC is wholly owned and operated by the Department of Veterans Affairs, and therefore is excluded from the coastal zone.

4.3.7 Hydrology and Water Quality

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Storm water runoff can impact water quality, contributing sediment and other pollutants exposed at construction sites. Any potential impacts to water quality from drilling test and service wells for a geothermal system would be short-term, localized, and negligible.

4.3.8 Noise

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Construction activity would increase ambient noise levels in the project area; however, noise levels would not exceed the specified limitations established by the VA’s Environmental Protection Specification, provided the contractors follow the limits established in the specification. As such, the overall impacts from construction, operation, and maintenance noise would be below any typical threshold of significance.

4.3.9 Community Services and Utilities

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Because there would be no change in the type of operations undertaken at the SFVAMC, and no substantial expansion of the services provided, there would be no impact on police protection, fire protection, parks or other community services.

4.3.10 Vegetation and Wildlife

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. Installation of the geothermal test boring/well would have no significant impacts to vegetation because the existing environment is existing open space with simple groundcover and shrubs.

Construction activities would displace common wildlife species that inhabit or use the area for forage or cover and potentially cause direct mortality of less mobile species. Because the site is currently disturbed from frequent human activity, any impact to wildlife would be negligible.

4.3.11 Solid/Hazardous Waste

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. The proposed geothermal test well would result in a short term increase in construction waste generation. An Environmental Protection Plan pursuant to the Department of Veterans Affairs Environmental Protection Specifications Section 01568 will be prepared for this proposed action. This plan will specify controls to be taken to manage environmental pollution, which includes the handling and disposal of solid waste. All solid waste will be transported and disposed of in compliance with Federal, State, and local regulations.

The installation of the geothermal test boring/well will not require disturbance to the existing buildings. As such, no potential asbestos material will likely be encountered during this proposed action.

No hazardous waste will be generated during the construction of the geothermal test boring/well.

4.3.12 Cultural Resources

Implementation of the Alternate No 2 design would present a potential lesser impact on cultural resources, compared to that of Alternate No. 1. Although the proposed action would be performed within a National Register-listed historic district, it would not be performed in close proximity to contributing resources (e.g., Buildings 9 and 10). The proposed action will be performed in existing open spaces, and will have no probability for impact to known cultural resources at the SFVAMC.

4.3.13 Socioeconomics

Implementation of the Alternate No 2 design will be similar to that of Alternate No. 1. The proposed action would not have significant adverse impacts, and therefore, any low income or minority populations that may be in the vicinity of SFVAMC would not be disproportionately affected.

Overall, the proposed geothermal retrofit project will not: 1) Substantially alter the location or distribution the local population, 2) Adversely affects the local housing market and vacancy rates, or 3) Results in substantial increase in resident population or alteration of demographic characteristics.

4.4 ALTERNATE NO. 3: NO ACTION ALTERNATIVE

Under this alternative, a geothermal test well will not be installed at the SFVAMC. Since the test well is required for full-scale geothermal design and system installation, performing this action would continue current operations at SFVAMC and energy needs would continue to be provided by the local utility companies. The proposed SFVAMC buildings will continue to receive heating and cooling energy from the local commercial utilities.

Taking no action would mean that surface soils would not be disturbed for the installation of the geothermal boring/well, local air quality would not be affected by temporary increases in fugitive dust, the short-term visual appearance of the site would not change, and runoff from the site would not carry additional sediments or contaminants that could affect water quality at off-site locations.

The no action alternative would not satisfy the purpose and need for the proposed action. The VA would still need to seek ways to address specific laws and executive orders requiring federal agencies to reduce energy consumption and improve energy efficiency through the use of alternative fuels and renewable sources.

5.0 Persons and Sources/Agencies Contacted

Persons and/or program information from the below resources were consulted in the preparation of this EA:

Persons Contacted:

Steven Malich, P.E., Contracting Officer Technical Representative, SFVAMC

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6.0 Glossary

Affected Environment – The existing physical, cultural or socioeconomic environment to be affected by a proposed action and alternatives.

Alternative – A reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2).

Attainment Area – An area designated to have air quality as good as or better than the NAAQS as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a nonattainment area for others.

Best Management Practices – Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

Candidate species – Species that have enough information to be proposed to be listed as threatened or endangered.

Cultural Resources – An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. Types of cultural resources include: historic properties as defined in the National Historic Preservation Act; cultural items as defined in the Native American Graves Protection and Repatriation Act; archeological resources as defined in the Archeological Resources Protection Act; sacred sites as defined in Executive Order 13007, *Protection and Accommodation of Access To "Indian Sacred Sites,"* to which access is provided under the American Indian Religious Freedom Act; and collections.

Cumulative Impacts (or Effects) – Impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (Federal or non-Federal) or person undertakes such other actions; effects resulting from individually minor, but collectively significant, actions taking place over a period of time.

Direct Use Geothermal System – In direct use geothermal systems, the supply of a steady stream of hot water comes from a drilled well into a geothermal reservoir. A system of piping, heat exchanger, and controls transports the hot water for use, such as heating a building (NREL, 2008).

Ecoregion – A geographic area of a particular collection of vegetation, wildlife, and ecosystems.

Ecosystem – A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.

Endangered Species – A species that is threatened with extinction throughout all or a significant portion of its range.

Environmental Assessment (EA) – A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

Environmental Justice – The confluence of social and environmental movements, which deals with the inequitable environmental burden born by groups such as racial minorities, women, or residents of developing nations.

Executive Order (EO) – An official proclamation issued by the President that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

Feasibility study – A study to determine the practicality of the proposed project.

Habitat – Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.

National Ambient Air Quality Standards (NAAQS) – Standards established by the U.S. Environmental Protection Agency that apply for outdoor air throughout the country. Primary standards are designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. The NAAQS represent maximum air pollutant standards that the U.S. Environmental Protection Agency set under the Clean Air Act for attainment by each state.

National Environmental Policy Act of 1969 (NEPA) – Requires all agencies, including VA, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision making (40 CFR 1500).

National Register of Historic Places (National Register) – A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

Particular Matter – Small solid particles and liquid droplets in the air.

Renewable Energy – Energy from the environment that is replenished (renewed), such as wind, geothermal, and solar.

Runoff – Non-infiltrating water entering a stream or other conveyance channel shortly after a rainfall.

Sediment – Any finely divided organic and/or mineral matter derived from rocks or biological sources that have been transported and deposited by water or air.

Silt Fence – A temporary barrier, consisting of a filter fabric stretched between supporting posts with the bottom entrenched in the soil, used to trap sediment.

Soil Erosion – The removal and loss of soil by the action of water, ice, gravity, or wind.

Storm water – Water discharges generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events. Storm water often contains pollutants in quantities that could adversely affect water quality.

Threatened Species – A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Wetlands – Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil, including swamps, marshes, bogs, and other similar areas.

7.0 List of Preparers

This Environmental Assessment has been prepared for the Department of Veterans Affairs, National Energy Business Center. The following individuals were primarily responsible for preparing and reviewing the document:

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